

From wang!elf.wang.com!ucsd.edu!info-hams-relay Sat Mar 30 15:10:10 1991 remote
from tosspot
Received: by tosspot (1.64/waf)
via UUCP; Sat, 30 Mar 91 10:55:32 EST
for lee
Received: from somewhere by elf.wang.com
id aa03291; Sat, 30 Mar 91 15:10:06 GMT
Received: from ucsd.edu by relay1.UU.NET with SMTP
(5.61/UUNET-shadow-mx) id AA26637; Sat, 30 Mar 91 09:57:36 -0500
Received: by ucsd.edu; id AA24224
sendmail 5.64/UCSD-2.1-sun
Sat, 30 Mar 91 04:30:30 -0800 for brian
Received: by ucsd.edu; id AA24217
sendmail 5.64/UCSD-2.1-sun
Sat, 30 Mar 91 04:30:26 -0800 for /usr/lib/sendmail -oc -odb -oQ/var/spool/
lqueue -oi -finfo-hams-relay info-hams-list
Message-Id: <9103301230.AA24217@ucsd.edu>
Date: Sat, 30 Mar 91 04:30:24 PST
From: Info-Hams Mailing List and Newsgroup <info-hams-relay@ucsd.edu>
Reply-To: Info-Hams@ucsd.edu
Subject: Info-Hams Digest V91 #252
To: Info-Hams@ucsd.edu

Info-Hams Digest Sat, 30 Mar 91 Volume 91 : Issue 252

Today's Topics:

 "Business use" and MARS
 *** Hams in Space ***
 a few fundamental questions about RF signals
 Apartment & Heath HW-9 QRP CW xcvr?
 ATV: AM or FM (2 msgs)
 Can you really learn code from tapes?
 Feed lines
 Iambic Keyer solutions.....
 MAJOR SOLAR FLARE ALERT - 29 MARCH - PROTON FLARE
 Solar Flux Index & WWV
 The Bands are DEAD
 The RAMSEY FM-10 STEREO TRANSMITTER KIT REVIEW (Longish)

Send Replies or notes for publication to: <Info-Hams@UCSD.Edu>
Send subscription requests to: <Info-Hams-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Info-Hams Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/info-hams".

We trust that readers are intelligent enough to realize that all text

herein consists of personal comments and does not represent the official policies or positions of any party. Your mileage may vary. So there.

Date: 29 Mar 91 17:55:35 GMT
From: zephyr.ens.tek.com!cascade.ens.tek.com!ronk@uunet.uu.net
Subject: "Business use" and MARS
To: info-hams@ucsd.edu

In article <"28-Mar-91.11:00:51.EST".*.Wayne_A_Lightsey.Roch809_XBS@Xerox.com>
UnspecifiedUser.Roch809_XBS@xerox.com writes:

...
>For
>example, a Corps of Engineers team, supported by MARS, in the field shoring up
>dikes to prevent floods, can order lunch delivered for the team via MARS
>communications facilities. A Red Cross field unit taking applications for
>disaster relief could order office supplies via MARS. Feeding the people,
>obtaining the office supplies is essential to accomplishing mission objective.
>
>You can't do that on ham radio under Amateur Service rules unless the people
>are under imminent threat of death or destruction of property - which
>constitutes a state of emergency!
>

I have only one problem with the last paragraph Wayne.

In the situations you have given as examples, YOU WOULD BE PROVIDING
COMMUNICATION SUPPORT FOR UNITS OPERATING IN A STATE OF EMERGENCY!

Of course, if it were not a State of Emergency, the Corp of Engineers could
drop what they are doing and go out for lunch and the Red Cross could send
a letter asking for the forms. :-) But then you wouldn't be with them
then would you?

Ron Kirkpatrick (it's in the mail, honest!)
Tektronix, Inc.
1-503-627-6707
ronk@tektronix.tek.com

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. .
. .
lines added to appease the Gods!

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. .

Date: 28 Mar 91 23:48:16 GMT
From: hpda!hpcuhc!pollux!mlau@hplabs.hpl.hp.com
Subject: *** Hams in Space ***
To: info-hams@ucsd.edu

In the Thursday March 28, 1991 Wall Street Journal front page under Business Bulletin there was a article mentioning HAMS in SPACE:

"All five astronauts on the coming Atlantis shuttle flight are licensed amateur radio operators. The first all-ham crew was inspired by its pilot Ken Cameron, who's active in radio education"

Date: 29 Mar 91 23:20:46 GMT
From: mojo!chuck@mimsy.umd.edu
Subject: a few fundamental questions about RF signals
To: info-hams@ucsd.edu

In article <NV9eZ1w163w@k5qwb.UUCP> lrk@k5qwb.UUCP (Lyn R. Kennedy) writes:
>dil@mace.cc.purdue.edu (Perry G Ramsey) writes:

>
>> In article <9171@plains.NoDak.edu>, kkim@plains.NoDak.edu (kyongsok kim) writ
>> > I wonder if the
>> > same RF signal can travel either through copper wire or through air. In
>> > other words, is there no difference between RF signal (say, for channel
>> > 4) that my TV receives from the air and RF signal (say, for channel 4)
>> > coming from CATV company through cable?
>>
>> None at all, except that one is an electromagnetic wave traveling through
>> the air and the other is an alternating current traveling through a
>> wire.
>>
>Note that once it gets to your antenna, the channel 4 signal on your
>antenna cable and the one from the cable company are the same. Now
>to start a new argument, the cable does not provide magnetic shielding.
>The cable doesn't radiate the signal only because the currents
>flowing in the center conductor and the shield are equal and
>opposite. Thus the two magnetic fields cancel out a short distance
>from the cable.

This is only true at very low frequencies, like DC. At any other frequency, it is false. Coax provides excellent shielding against ac magnetic fields.

In coax cable, at the frequencies that hams use (>100KHz or so) the signal is not being conducted by the shield or the center conductor. It is traveling thru the center conductor's dielectric as an E-M wave. This E-M wave is being

guided by the center conductor and the shield. But this is another story.

The coax does a fine job of shielding high frequency ac magnetic fields, and is also quite good at low frequency ac magnetic fields. When an ac magnetic field tries to penetrate a conductor such as the shield, an electric field is induced in a perpendicular direction to the magnet field vector. This electric field is positioned in such a way that it is trying to induce a voltage across a good conductor (the shield). Since we are all electrophreaks, know what happens when we try to induce a voltage across a short circuit: we get current and lots of it! With the current comes a magnetic field that is opposite in polarity, and equal in magnitude to the original magnetic field. Since we have two magnetic fields, equal in amplitude, and opposite in polarity, they cancel each other out. Thus coax does a fine job of shielding ac magnetic fields. (so does a copper box, ever hear of Faraday?)

Whew! Enough of the Rf geek stuff, this is rec.radio something or other.

73,

Chuck Harris - WA3UQV
chuck@eng.umd.edu

Date: 27 Mar 91 21:25:51 GMT
From: hpda!hpcuuhb!hpindda!genem@hplabs.hpl.hp.com
Subject: Apartment & Heath HW-9 QRP CW xcvr?
To: info-hams@ucsd.edu

Correction: The rig is 15 watts, not 25.

Date: 29 Mar 91 22:00:46 GMT
From: epic!karn@bellcore.bellcore.com
Subject: ATV: AM or FM
To: info-hams@ucsd.edu

Phil Howard,

FM is used for satellite TV transmission, mainly because the satellite power levels are much too low to provide an adequate video S/N ratio using AM. The superior performance of FM comes at the expense of considerable RF bandwidth: the conventional FM TV signal on C band (4 GHz) fills a 36 MHz bandwidth transponder, and the channels are on 40 MHz spacings. This is a fairly high modulation index, so the threshold effects are very strong; a change of a fraction of a dB in the input C/N can produce a very dramatic change in the output video S/N.

But you're quite right, for small modulation indices FM provides no real advantage over AM.

Phil

Date: 30 Mar 91 00:33:24 GMT
From: swrinde!elroy.jpl.nasa.gov!usc!wuarchive!zaphod.mps.ohio-state.edu!caen!news.cs.indiana.edu!ux1.cso.uiuc.edu!phil@ucsd.edu
Subject: ATV: AM or FM
To: info-hams@ucsd.edu

smith@sndpit.enet.dec.com (Willie Smith) writes:

>I saw (was it here on the net?) a wider channel (12 MHz?) in one of the
>higher bands for FMTV, so I suspect it takes more bandwidth. I'm told that
>the standard for FM ATV deviation is some 16(?) MHz, giving something like
>50 MHz bandwidths [using $BW=2(\text{dev}+F_{\text{max}})$]. This gives really nice
>pictures, or so I'm told, but it really chews up bandwidth.

The ARRL bandplan for 12cm...

BTW I refer to 2300-2310 MHz as 13cm and 2390-2450 MHz as 12cm

...includes 1 or 2 wideband ATV channels apparently intended for FM ATV. But as discussion goes on, it is apparent that these subbands are only adequate to limit the very strongest parts of the ATV signal in FM. They would work nicely for true AM.

>On the other tentacle, satellite TV bandwidths are something like 10 MHz,
>including a couple of sound carriers and a digital link, and those are FM,
>so it must work in narrower bandwidths.

Satellites have 2 advantages:

1. All the signals are of equal level no matter where you are. There is little chance that the adjacent channel will be much stronger than the one you want to receive.
2. Alternating channels have different polarity, making it possible to squeeze the channels a little tighter than would otherwise be possible.

In amateur radio we have little opportunity to do this kind of thing.

>>Yet I am told by the maker of the FM equipment that the signal takes no
>>more room than an AM signal.

>I think I've talked to the same vendor. His message seems to be "Set the
>deviation so the main carrier takes up the full 6 MHz of allocated
>bandwidth and don't worry about (or let others worry about) the sidebands."

Try 5 kHz deviation. You will still be taking up more than 7.159 MHz for an NTSC color signal. This is not because of the deviation, but because of the highest frequency. But at 5 kHz deviation, you are not getting ANY capture effect at all; you might as well just use AM.

>I might be getting some FMTV gear in the next couple of months, (anything
>has to be better than the AMTV gear I've seen advertized), and I'll be

FM ATV might be better than whats on the market otherwise, but you might find yourself at the wrong end of interference complains from fellow hams once there is significant activity in the band you plan to use. The 23cm band is riskier than the 12cm band in this regard since the latter has wider TV subbands AND fewer users.

>trying different deviations, bandwidths, and powers, so hopefully I'll have
>some real numbers to talk about. But it does sound like when I cut the
>deviation way down like that I'll be getting lower (than optimum) picture
>quality and losing the 'capture effect' (which apparently depends on the
>deviation being larger than the highest-modulating-frequency). The quick
>answer seems to be that nobody knows....

Consider WHY there is a capture effect in FM. Hard limiting of the carrier strips off any AM envelope, but any ASYMMETRIC interference (noise counts) also introduces itself as phase changes as well. An SSB signal with the carrier reinsert will appear to have BOTH amplitude AND frequency (actually phase) modulation. Examining this modulation in terms of a vector diagram will show that it does indeed have phase modulation (though not linear to angles). Thus if you intersted this SSB+Carrier signal on top of an FM or PM signal, it would add VECTORS to the FM/PM signal and cause changes in the phase angle as well as amplitude.

However simply adding vectors can at best roll the phase angle around only 180 degrees, usually less. FM at high modulation indexes will actually roll the phase angle around MORE than 180 degrees. The greater the modulation index, the more the phase angle will roll around the vector circle. All the extra sidebands being generated are really all contributing, in a coordinated way, to this big phase change. The vector addition interference from a single signal source just cannot match all that modulation very easily.

Of course this is a simplified exaplanation. If think it was complex, then try to tackle the math :-)

But the end explanation is that the benefit FM gets is from the fact of

having a high modulation index, and that results in more sidebands.
Its all those sidebands that make FM what it is. Take them away and you have little more than AM.

But even if you have a poor modulation index at high video frequencies you can have a high one for the low frequencies. But to keep the signal within the 6 MHz (3 MHz each side of carrier) for a BLACK AND WHITE video of 2.5 MHz you better keep the deviation under 1 MHz peak-to-peak.

>I'm not sure you _can_ filter them off, they aren't just unwanted spurs,
>they are sidebands of your signal, and if you filter them off your main
>carrier will be distorted in some way. I don't know, and I can't find
>anyone who knows, so I'm going to go ahead and try it out and determine
>what's the minimum usable abndwidth and deviation for FMTV.

Be sure to compare the effects of video quality vs. levels of interference.
For interference, consider measuring these aspects:

Can I hear anything in the weak signal subbands 1 block away?

Will it open up the squelch of an FM HT a couple houses away?

For video, try it with a full color NTSC signal, a black and white video signal, and a lowpassed black and white video signal. If you can do so, compare results with an AM equivalent.

You can filter anything you want. Of course if you filtered off anything important, you have damaged your signal.

--

```
/*****\
/ Phil Howard -- KA9WGN -- phil@ux1.cso.uiuc.edu      \
\ Lietuva laisva -- Brivu Latviju -- Eesti vabaks    /
\*****/
```

Date: 29 Mar 91 18:17:23 GMT

From: pa.dec.com!hollie.rdg.dec.com!ryn.mro4.dec.com!ultnix.enet.dec.com!
taber@decwrl.dec.com

Subject: Can you really learn code from tapes?

To: info-hams@ucsd.edu

> Re. learning Morse.

> Has anyone found teaching tapes that useful?

I think that it would help to distinguish code learned for operating from code learned for the purpose of passing the test. In the latter case, tapes are a perfect medium for learning since they closely approximate the conditions of the test. Can code be learnt that way? You bet.

If the point is to learn code to operate, then there aren't a lot of outstanding tapes around. I've found the "QSO Master" tape to be helpful because it works on teaching the word-sounds of common CW abbreviations and phrases. Other than that, the code is too perfect to be helpful in listening to what's on the bands.

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>>>==>PStJTT
Patrick St. Joseph Teahan Taber, KC1TD

If I was authorized to speak for my employer, I'd be too important to waste my time on this crap....

Date: 29 Mar 91 23:05:03 GMT
From: pyramid!infmtx!randall@hplabs.hpl.hp.com
Subject: Feed lines
To: info-hams@ucsd.edu

In article <1991Mar29.044134.613@bradley.bradley.edu> moodyblu@buhub.bradley.edu (Matthew Weisberg) writes:

>Hello. As a new ham awaiting my license, I have been figuring out what I
>am going to do for an antenna. As a renter, I am limited, but I have
>decided to put up a dipole outside right now (I live in a duplex).
>However, I am trying to figure out how I am going to get the feedline into
>the house. My landlord will not let me make another hole in the wall, so I
>was thinking about bringing it in through the same hole the CATV line comes
>in. Will this create any problems with the cables so close?? Does anyone
>have any better ideas on how to get a feedline inside without making new
>holes in the wall?? Thanks..

Have you considered using ladder line? Since it's very thin, I just squish it under the window, and close the window right on top of it.

If you feed a dipole with ladder line instead of coax, and you have an antenna tuner, you can tune the antenna for use on all HF bands. This type of antenna is called a "center fed zepp", although this is something of a misnomer.

--

Randall Rhea
Senior Programmer/Analyst, MIS

Informix Software, Inc.
uunet!pyramid!infmtx!randall

Date: 29 Mar 91 20:32:07 GMT
From: usc!wuarchive!udel!brahms.udel.edu!moyer@ucsd.edu
Subject: Iambic Keyer solutions.....
To: info-hams@ucsd.edu

Has anyone come up with a CHEAP iambic keyer? Everything commercially available is EXTREEMLY overpriced. I've never seen anything so rediculus, in fact. I heard that there was an iambic keyer IC that just needed some support components and a key to run. Does anyone know where I can get one? I can build an acceptable paddle out of anything, but if I design the circuitry myself, it'll take too many chips to be compact.

Anyone out there have any innovative solutions? I think I ought to start a company selling self contained keyers for what they should _really_ cost. (~ \$20.00).

TNX

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Eric P. Moyer      /----- You are a fluke of the universe. -----/
moyer@brahms.udel.edu /          You have no right to be here.          /
  Into the night as.... /          Whether you can hear it or not,          /
KA3YED on 28.460 MHz /--- The universe is laughing behind your back. -/
```

Date: 29 Mar 91 18:57:16 GMT
From: news-mail-gateway@ucsd.edu
Subject: MAJOR SOLAR FLARE ALERT - 29 MARCH - PROTON FLARE
To: info-hams@ucsd.edu

-- MAJOR SOLAR FLARE ALERT --

MARCH 29, 1991

Flare Event Summary
Potential Impact Assessment

MAJOR ENERGETIC EVENT SUMMARY

Region 6555 has managed to spawn another large major flare, located at S28W60. The flare was rated a class X2.4/3B which began at 06:41 UT, peaked at 06:51 UT and ended at 07:09 UT on 29 March. This flare was associated with a strong Type II sweep. No Type IV was observed. A slight proton

enhancement began several hours after the flare, but has since decayed to below event thresholds.

Region 6555 is continuing to decay slowly. The penumbral extent of the region has diminished, although the region has a significant amount of magnetic complexity. By about April 1, this region will rotate behind the west limb. This region probably won't return to the east limb in a threatening configuration.

POTENTIAL TERRESTRIAL IMPACT ASSESSMENT

This most recent flare could produce some active geomagnetic activity over the middle latitudes, although storming is not expected. The activity, if it occurs, will likely not materialize until sometime on March 31 or 01 April. The majority of activity should take place on 01 April. High latitudes might experience some periods of minor storming, although the intensity of the storming (if it occurs) should be low.

The following alerts have been CANCELLED:

- SATELLITE PROTON EVENT ALERT
- POLAR CAP ABSORPTION EVENT ALERT
- POLAR AND HIGH LATITUDE RADIO SIGNAL BLACKOUT ALERT

All alerts are now inactive. The following warnings are IN PROGRESS:

- POTENTIAL MAJOR SOLAR FLARE WARNING
- POTENTIAL PROTON FLARE WARNING
- POTENTIAL POLAR CAP ABSORPTION EVENT WARNING
- POTENTIAL POLAR LATITUDE RADIO SIGNAL BLACKOUT WARNING

** End of Alert **

Date: 30 Mar 91 01:19:05 GMT
From: swrinde!zaphod.mps.ohio-state.edu!usc!apple!portal!cup.portal.com!
Jeepster@ucsd.edu
Subject: Solar Flux Index & WWV
To: info-hams@ucsd.edu

If you're into long distance calling, you can call 303-499-7111 and listen to WWV that way (it's a Boulder, Colorado number, at whatever they call that place now, national institute of standards and technologies?).

Date: 29 Mar 91 19:14:13 GMT
From: milton!sumax!thebes!polari!mzenier@beaver.cs.washington.edu
Subject: The Bands are DEAD
To: info-hams@ucsd.edu

In article <1991Mar25.165713.22177@lopez.UUCP> flash@lopez.UUCP (Gary Bourgois) writes:

>
>Around 0400Z last night, I did try for RNI on 7520. It was Der
>Sproutling, and he sounded like he was speaking from the other side of
>the moon. The funny thing is that the meter showed S-9, but the signal
>was all but inaudible anyway, sounded like it was going through the
>worlds weirdest echo box. Very underwater sounding.

RNI always sounds bad here. I havn't heard that
bad audio quality since pre-glasnost Radio Moscow.
(Saturday Nights on 7520)

Mark Zenier markz@ssc.uucp mzenier@polari.uucp

Date: 29 Mar 91 18:05:31 GMT
From: usc!samsung!umich!sharkey!lopez!flash@ucsd.edu
Subject: The RAMSEY FM-10 STEREO TRANSMITTER KIT REVIEW (Longish)
To: info-hams@ucsd.edu

In article <1991Mar27.235352.17436@informix.com> randall@informix.com (Randall Rhea) writes:

>I big thank-you to Gary for his outstanding review of the Ramsey FM
>Stereo transmitter.

You be more than welcome....

>I have had the following problems:

>1) I cannot get the thing to work on frequencies above 98 MHz. You have
>a choice of three capacitors to solder into the unit depending on the
>frequency range you want. Only the capacitor designed for the low end of
>the band seems to work.

Mine is on 100.1, which used to be used here, but the station moved (to
add more power) I used the capacitor supplied for the TOP of the band
(there are three to chose from, so do your research first before you
solder it in). Mine came on at 102.3 so I had to tune it DOWN. I think

your problem is probably just localized to your particular unit. You might try purchasing a replacement capacitor from radio shack.

>2) That little variable capacitor that controls the subcarrier is indeed >important. You need to be very patient in adjusting this thing, or your >receiver's stereo light will not come on.

Well like I said, MINE came on IN STEREO (believe it or not) but you have to tune it slowly because there is only 5% of the range of the adjustment that works.

>3) Getting the transmitter tuned to exactly the right frequency is >not easy. You need a TV alignment tool and a lot of patience. On >modern digital FM receivers, such as my car stereo, you will not get the >stereo light to come on unless you've got the transmitter tuned correctly.

I did not have a TV alignment tool and at 3:25AM no way to get one. I busted a tine of a plastic fork, and it worked PERFECTLY.

I have noticed the following though:

The unit does drift slightly, and your antenna loads the tank circuit somewhat. Depending on which antenna I use, the unit will shift frequency. A bigger antenna puts the signal higher in the band.

>4) Finding an open frequency in the SF area, or any large metropolitan >area, is very difficult. This of course is not a problem with the >transmitter, but it can reduce its usefulness.

Well no such problem here. We have only four stations, and they are all horrible. Now the RAMSEY is my FAVORITE local station (I am sure the neighbors don't agree, since the format is so CHANGEABLE :-)

>I hooked the transmitter to a 2-meter ham J-pole antenna on the roof, >and found that its range was about 1/2 mile. If I built an antenna >that was tuned to 88 MHz, I could probably increase its range.

I started with the indoor ground plane, and loved the nice solkd signal all over the house and yard. UNTIL one of my ham friends a mile away and over a hill said the signal was copyable on his ZENITH TRANS-OCEANIC with indoor antenna. This was during some weird weather, so that might have had something to do with it, but I immediately made a smaller antenna to keep the signal on my own block. Now it is a little noisy in the computer room on my walkman, but at least the FCC won't be trying to find the location of the "weird" station, hi. If I had a field strength

meter, and could verify that it was indeed 250 microvolts at one meter away (I kinda think it was, but did not want to take chances)

--

=Marquette MI: It's Not the END of the world, but you can see it from here=
== Gary Bourgois flash@lopez (rutgers!sharkey!lopez!flash) GWN UPLink ==
== 3.950 Nationwide Amateur Radio Nightly after 0200z=Learning Channel ==
===== WB8EOH = The Eccentric Old Hippie = WB8EOH =====

Date: 29 Mar 91 23:43:28 GMT
From: price@marlin.nosc.mil
To: info-hams@ucsd.edu

References <f76f6q@rpi.edu>, <50a31070.20b6d@apollo.HP.COM>,
<1991Mar29.174419.16686@dartvax.dartmouth.edu>
Subject : Re: Info on new Ten Tec HF Rigs (Esp. QRP Model)

Bill,

I saw the new Ten Tec QRP rig at the ARRL convention here in San Diego last September. It looks exactly like the new Ten Tec 100 watt Xcvt minus a few whistles/bells and 95 watts of power. BUT it's not much less expensive--it's (yikes) \$1200 as I recall.

I own an original Ten Tec Argonaut, and I love it. I'm sure the new receiver would be much better, the synthesized tuning would be handier, the two VFOs would be nicer, etc, but for a couple hundred bucks, you can sure have lotsa QRP fun with a used Argonaut! The trick is finding one. Ten Tec will go thru it for ~\$50 and peak-and-tweak.

I'm disappointed that Ten Tec opted for an expensive QRP rig. I can easily understand why one would want a QRP rig since I'm kinda "into" that. But I have a harder time imagining people spending over \$1K for a QRP rig when you can buy a TS-440 for about the same money and crank it down (or up) to any power you want less than 100 watts.

I will also be interested to hear if anyone on the net has had experience with the new rig yet.

73--Jim, K6ZH

Date: 30 Mar 91 04:34:49 GMT
From: swrinde!cs.utexas.edu!asuvax!ukma!widener!netnews.upenn.edu!dsinc!wells!
k3tx@ucsd.edu
To: info-hams@ucsd.edu

References <f76f6q@rpi.edu>, <50a31070.20b6d@apollo.HP.COM>,
<1735@marlin.NOSC.MIL>
Subject : Re: Info on new Ten Tec HF Rigs (Esp. QRP Model)

1. K6ZH has worthwhile comments about the new
T-T QRP - -
2. but to suggest that it's overpriced because
for "just a little more you could have a 440(!)
3. Why would *anyone* even mention a Kenwood 440
when for equal or ***LESS*** he could have ANY
Ten-Tec?
4. Or are bells-and-whistles more important than
Rec and Trans PERFORMANCE?
5. Not to me they aren't.
6. This space left blank intentionally

K3TX-----

6. tsl

End of Info-Hams Digest
